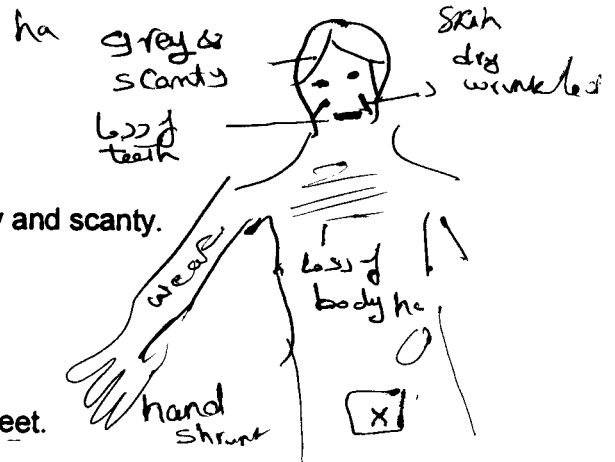


X TSH
X ACTH
X MSH

X GH



- Loss of body hair.
 - Scalp hair becomes prematurely grey and scanty.
 - Loss of teeth.
 - Great emaciation.
 - Skin is wrinkled and dry.
 - Shrunken appearance of hands and feet.
 - Muscles weakness.
- Thyroid deficiency:** Anaemia, low metabolic rate.
 - Hypogonadism:** Impotence and amenorrhea.
 - Suprarenal cortical deficiency:** Hypoglycemia and decreased 17 ketosteroids.
 - Pallor:** It is caused by deficiency of MSH and ACTH.
The condition progresses to acute adrenal insufficiency, coma and death.

Posterior pituitary gland

(Neurohypophysis)

Hormones of the posterior pituitary are:

OXYTOCIN and VASOPRESSIN (Antidiuretic hormone) :

8 AA

Supraopt → ADH
Para vent → oxyt.

Neurophys

Knobs

e

- Chemistry:** Each hormone is an octapeptide (8 amino acids). There is structural and functional relations between oxytocin and vasopressin.
- Formation :-** Formed in supraoptic and paraventricular nuclei of the hypothalamus. (the supraoptic nucleus forms mainly ADH, while the paraventricular nucleus forms mainly oxytocin).
- Transport:-** Transported, in combination with a carrier protein called neurophysin down the axons of the neurons of supraoptic and paraventricular nuclei by axoplasmic transport at a rate of 3 mm / day. The axons are called hypothalamo- hypophyseal tract.
- Storage:** Stored in the neurohypophysis as secretory granules. (synaptic vesicles) at synaptic knobs of neurons of supraoptic and paraventricular nuclei.
- Release :** Released together with neurophysins. Hormones are released in response to nerve impulses transmitted from the supraoptic and paraventricular nuclei. Release occurs by exocytosis which needs calcium. (Considered neurohormones).

- **Transport in blood:** Both hormones are transported in the blood in loose association with plasma globulin.
- **Inactivation:-**
 - Both are inactivated in liver, oxytocin by oxytocinase and vasopressin by vasopressinase.
 - Vasopressin has a very short half life (8 minutes). It is also removed from the blood by the kidney. In the kidney, only 1/4 the hormone is excreted in urine, the rest is fixed at renal tissue.

Antidiuretic hormone (vasopressin)

Actions of antidiuretic hormone (ADH):

1. On the kidney : (Antidiuretic effect):-/

- ADH increases the permeability of distal and collecting tubules to water which leads to passive water reabsorption.
- This effect is mediated via v₂ vasopressin receptors
- This is mediated by cAMP.

2. On the blood vessels: (Vasopressor effect):-/

- ADH, in pharmacological (large) dose cause direct powerful vasoconstriction to all blood vessels including the coronary vessels → increased ABP and myocardial ischaemia.
- This effect is mediated via v₁ vasopressin receptors.

3. On other smooth muscles: /

- ADH causes direct stimulation to all smooth muscles in the body (walls and sphincters) → colics.
- ADH also stimulates uterine contraction. (oxytocin like action).

4. On ant. Pit: / ADH through the venous connection reaches the anterior pituitary and acts as CRH. (Corticotropin releasing H). → ↑ACTH.

5. On the metabolism: /

- ADH stimulates glycogenolysis in liver → ↑ blood glucose.
- ADH decreases the basal metabolic rate.

Control of ADH secretion:

[Plasma osmolality ↓ ECF vol]
[Stress - Env. temp]

1. **Plasma osmotic pressure changes:** (Most important). An increase in osmotic pressure (osmolality) of the plasma (ECF) causes dehydration of osmoreceptors in the ant. hypothalamus, which stimulates the release of ADH and vice versa.

2. Blood volume changes:-

- A decrease in ECF volume (Haemorrhage), will decrease the inhibitory impulses of stretch receptor thus ADH is released and vice versa.

Such stretch receptors are present in the carotid sinus, aortic arch, left and right atria and pulmonary veins.

The high pressure stretch receptor (in aortic arch and carotid sinus) \rightarrow \uparrow ADH when ABP is \downarrow .

- Low pressure stretch receptors are the primary mediators of volume effects on ADH. Moderate \downarrow in blood volume \rightarrow \downarrow central venous pr. without \downarrow in ABP \rightarrow \uparrow ADH secretion through atrial receptor.

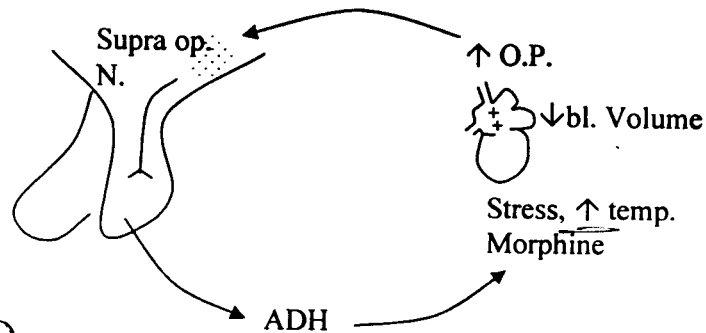
3. Stress:-

Stressful conditions as trauma (pain) surgery, anaesthesia, hypoglycemia, infection increase secretion of ADH.

4. Environmental temperature:-

- Rise of environmental temperature increase ADH release.
- Cold inhibits the release of ADH.

↓ ADH release in sweat



5. Drugs:-

- Drugs that increase ADH secretion include:
 1. nicotine.
 2. opiate (morphine).
 3. Barbiturates.
- Drugs that inhibit ADH release include :-
 1. Ethanol.
 2. Opiate antagonists.

Diabetes insipidus: Diabetes = to pass large volume of urine.

Insipidus = tasteless

- **Definition:-** Disease characterized by passage of large amount of diluted tasteless urine.
- **Causes and types:** Diabetes insipidus is of two types:
 1. **Pituitary type:** It is due to \downarrow ADH secretion as a result of destruction of the supraoptic and paraventricular nuclei or their nerve fibers.

2. **Nephrogenic type:** It is due to failure of kidney to respond to ADH.

• **Characters:**

1. **Polyuria:** caused by failure of H_2O reabsorption. Urine volume usually varies from 4 – 20 Liters / day. Specific gravity of urine is low (1002 – 1003).
2. loss of water soluble vitamins.
3. **Polydipsia:** Excessive drink secondary to polyuria.
4. Increased basal metabolic rate to maintain body temperature constant inspite of excessive fluid intake with low temperature.

قسم الكلى والكلى
46 1m

Oxytocin = hormone accelerating labor.

Actions of oxytocin:

a. In females:

1. **on mammary gland:-** Milk ejection , (Milk let down effect).

This is the most important effect of oxytocin. Oxytocin contracts myoepithelial cells surrounding the breast alveoli. This causes milk to be squeezed from the alveoli and fine ducts into the large ducts so that the baby can obtain it by suckling.

2. **on uterus:-**

- It stimulates uterine contraction especially in pregnant uterus near the end of pregnancy.

-This effect is done by lowering the threshold of stimulation of uterine smooth muscle (myometrium) which is enhanced by estrogen and inhibited by progesterone.

-This contraction is important:-

- a- During labor:- It participates (shares) in the process of normal labor.
- b- After labor:- It helps uterine involution in the post partum period.
- c- Before labor:- Oxytocin facilitates sperm transport in non pregnant uterus during act of mating (suction force).

- 7 b. **In males:** Oxytocin contracts the plain muscles of testicles and epididymis and aids sperm transport.

c. In both sexes:

- Oxytocin has slight antidiuretic and pressor effects, (ADH like action).
- Oxytocin squeezes the secretion of apocrine sweat glands.

* Control of oxytocin secretion:

Oxytocin secretion is increased by neuro-Endocrine reflex:

1. **Suckling reflex:-** During suckling, touch receptors in the nipple send afferent impulses, which reach the hypothalamus and cause oxytocin secretion.
2. **Labor:-** Dilatation of cervix and descent of fetus at birth canal initiates afferent impulses, which stimulate the hypothalamus to secrete oxytocin, which increases uterine contraction → More dilation of cervix → more oxytocin (positive feed back).
3. **During the act of mating (Sexual intercourse):-** The genital stimulation and stretch of vagina during intercourse → hypoth → oxytocin → help sperm transport.

